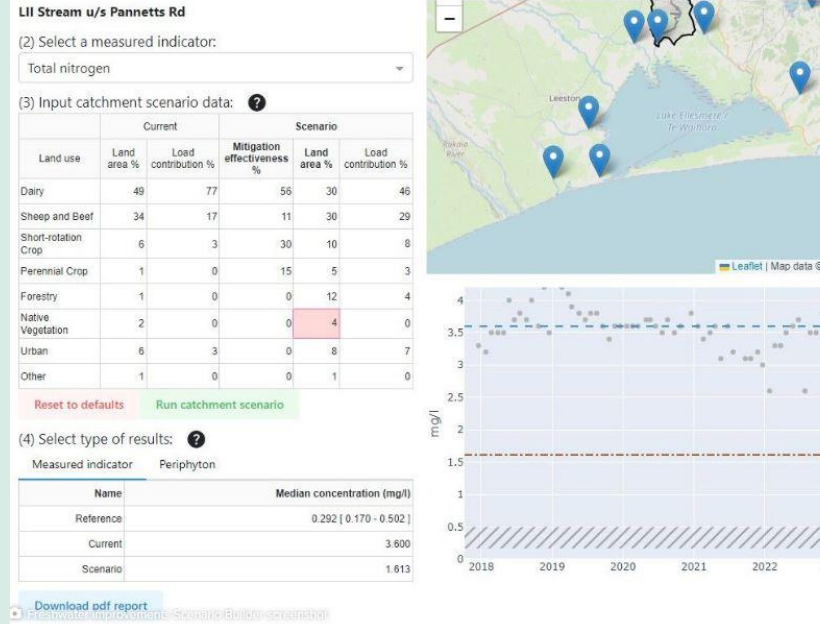


Online Tools Show Where Land-Use Change Needs to be Considered

We now know where land use needs to change, to meet New Zealand policy expectations for water quality.



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Interactive online tools funded by Our Land and Water clearly show where water quality exceeds national bottom lines and the potential for on-farm land management strategies to reduce contaminant loss to water. Where applying all known mitigation strategies won't reduce contaminant loss sufficiently to meet regulatory requirements, some land-use change needs to be considered.

This knowledge enables the assessment of whether it's practical and cost-effective for farmers in a catchment to invest in mitigation strategies alone, or if some new land-use options should be considered. Such decisions are critical to achieving Our Land and Water's mission to develop knowledge and tools to improve freshwater quality in Aotearoa.

Previously, this information was known in some regions, but methodology differed between regions and knowledge was dependant on the resourcing of regional councils. There was a need to make catchment models more accessible and useable by freshwater managers. Our Land and Water research used standardised modelling to provide information nationally, at a catchment scale. These tools can also be customised to specific regions or to explore specific issues.

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The online tools funded by Our Land and Water were developed from models previously developed by Our Land and Water research to estimate the effect of mitigations on improving water quality, and to estimate 'reference' conditions (the state of freshwater without human actions affecting it), with research led by Our Land and Water chief scientist Richard McDowell. Another model translated these models into periphyton (algae and other microbes in freshwater environments), led by Ton Snelder (LWP). These models were used as the basis for building four interactive spatial tools.

The [Freshwater Improvement Scenario Builder](#) enables users to visualise information on existing and reference water quality at every river monitoring site nationally. It displays the proportion of main land uses (such as dairy or forestry) in a catchment and their contribution to nitrogen, phosphorus and *E.coli* loads. The user can then create scenarios that mix mitigation strategies and land use change, to see how water quality is affected. This demonstrates the scale of change that might be required over time to improve water quality.

The Scenario Builder was developed by Dr Olivier Ausseil (Traverse Environmental), Dr Mike Kittridge (Headwaters Hydrology) and Dr Snelder with 'impact extension' funding provided to the programme [Monitoring Freshwater Improvement Actions](#).

In addition, three interactive maps were developed by Peter Pletnyakov (AgResearch), also through impact extension funding. Each of the three interactive maps focuses on a specific contaminant of concern: nitrogen, phosphorus and sediment. The user can swipe the map between two different views: total yield of the contaminant at a location of interest, and the potential for on-farm actions to reduce loss of the contaminant from land to water. The [nitrogen map](#) was published in November 2020 and has been visited over 17,000 times. The [phosphorus](#) and [sediment maps](#) were published in May 2024.

There was stakeholder demand for these tools. The need for the Freshwater Improvement Scenario Builder was identified through the project team's direct involvement in freshwater policy development processes over the last 15 years. The tool was co-developed with and beta-tested by scientists from Waikato, Horizons, Otago and Gisborne regional councils. Several live demonstrations and webinars were run with NZARM, MPI's On-Farm Support team, and regional council science and policy teams.

The Scenario Builder tool has received very positive feedback from users, and the project team has been approached by several councils to discuss potential customisation of the tool to local datasets and issues. It is being further developed to incorporate lakes nationally and to support stakeholder engagement for freshwater policy development for Waikato Regional Council and Gisborne District Council.

Our Land and Water's focus on research impact, and small project funding for impact extension activities, enabled the creation of these user-focused tools that provide direct access to complex research outputs. If it were not for this focus, it is likely the research would have remained as models and publications, requiring scientific expertise to access and interpret.

This article was prepared as an impact case study for MBIE as part of Our Land and Water's 2023–24 annual reporting requirement.

Additional information:

- Interactive tool: [Freshwater Improvement Scenario Builder](#)
- Interactive tool: [Map of Total Phosphorus Excess and Reduction Potential](#)
- Interactive tool: [Map of Total Nitrogen Excess and Reduction Potential](#)
- Interactive tool: [Map of Total Sediment Yield and Reduction Potential](#)
- Project: [Monitoring Freshwater Improvement Actions](#)

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